

HARVARD MEDICAL SCHOOL

THEORY AND PRACTICE

1900-1901

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THE HISTORY.

WRITE down first the name of the patient, married or single, age, residence and birthplace (malaria, hydatid, etc.), occupation (eye strain, writer's cramp, stone cutter, painter, etc.) and the date on which he is seen.

The patient should be questioned first about the present illness, whether his disease is acute or chronic. Having obtained a general idea of its nature, the family history and personal history should be taken and the present illness obtained in detail. If the patient is very ill, depend largely on the friends for data and obtain other necessary information during later visits. Avoid embarrassing questions in the presence of a third person.

As a rule, let the patient tell his story, simply guiding his narrative into profitable channels. Avoid leading questions. Do not be misled by his medical expressions. Lay diagnoses of meningitis, influenza, gastric catarrh, rheumatism and dysentery are untrustworthy and should be independently diagnosed by the doctor. Note the difference between chilliness and a true chill. Sometimes the history obtained is incorrect because of the dulness of the patient, either natural or due to the disease. Here repeated questioning alone secures a satisfactory result.

Histories obtained from hospital patients are proverbially unreliable. These people are for the most part ignorant, overworked and unobservant. No matter what methods are employed to obtain the histories, it is well to be sceptical about their accuracy, especially when the physical examination furnishes contradictory evidence. In children this is even more important. Most children are unable to furnish information about themselves, and their histories must be obtained from people in charge.

Children usually answer questions incorrectly which concern their present sensations. This may be from fear, embarrassment, misunderstanding, etc. Information obtained in this way often leads to incorrect diagnoses.

General questions as to heredity are equally unsatisfactory. Definite interrogations must be put, but where one has fears for the truthfulness of an answer, the information must be obtained in a more roundabout way, — e. g., such patients will agree to a parent having had “nerve trouble” or “brain trouble” who might deny the presence of family insanity. Tubercular ancestry is important, but it is also desirable to know whether the relative died years ago or has lived in contact with the patient.

In the personal history illnesses are often forgotten, so it is well to mention specifically the infectious diseases, — chorea, rheumatic fever, etc. As a rule, one can get a more satisfactory answer regarding habits toward the end of a visit than at the beginning, but in no case must one neglect inquiries concerning alcohol, tobacco, tea, coffee, times and methods of eating and sleeping and venereal disorders. In this last matter, indirect questions are often best. A patient will admit having had a “strain” or frequent and scalding urine, who will deny gonorrhea. On the other hand, inquiries about pregnancy, catamenia, etc., should be simple and straightforward, not suggested in a roundabout prudish manner.

Present Illness. The first question should always be “How long have you been ill?” “How long in bed?” and the next, “What was the first symptom?” — “the next symptom?” and so on tracing the course of the disease. The patient’s answers suggest other subjects important in the differential diagnosis and it is here the doctor or student shows the extent and accuracy of his medical knowledge by asking enough, but not too much. Individual symptoms (e. g. abdominal pain, etc.) should be analyzed according to their mode of onset, frequency, duration, character and severity. Always consider the temperament of the patient when statements are made dealing with pain, discomfort or fatigue. The following questions are very valuable in summing up the case: —

“How long ago did you call yourself perfectly well?”

“When did you stop work?”

“What one thing troubles you most?”

“If you were cured of x, y and z would you consider yourself well?”

It is desirable to include in the history a few general questions concerning the appetite, the bowels (daily or otherwise), ability to sleep and work (as an index of the sufferings), also questions about the functions of the various systems not included in the patient's statement.

(*e. g.*) **Digestive.** Nausea, discomfort after eating, vomiting, bowels.

Respiratory. Cough, sputum, pain in chest.

Circulatory. Dyspnoea, palpitation, oedema.

Nervous. Headache, convulsion, paralysis.

Urinary. (*a*) Renal: headache, amount of urine, oedema.

(*b*) Vesical: dysuria, anuria, frequent micturition.

The mere fact that a patient vomits or expectorates is of little value. The amount, color, presence of blood and mucus are all important.

*GENERAL EXAMINATION OF THE BODY.

General Nutrition. Muscular development, size, weight, figure, attitude, decubitus.

Skin and Mucous Membranes. Pale, flushed (hectic), cyanosed, pigmented (jaundiced, bronzed skin and buccal mucous membrane). Cold, hot, dry, moist, satiny (alcoholic), rough. Scars, eruptions (Koplik's sign), oedema, emphysema, calluses, rheumatic nodules.

Temperature. Mouth, axilla or rectum.

Pulse. Rate, tension (or compressibility), volume (or wave), rise (or shape of wave); compare radials. Capillary pulse. Water-hammer pulse (Corrigan).

Arteries: Size, abnormal course, arterio-sclerosis, auscultation of.

Veins: Size, pulsation (systolic or slow presystolic, fill from below?) auscultation of, varicosity.

Respiration. Frequency, painful, shallow, costal, diaphragmatic. Dyspnoea (expiratory, inspiratory, Cheyne-Stokes).

Glands. Suboccipital, mastoid, parotid, sub-maxillary, superficial and deep cervical, supraclavicular, axillary, epitrochlear, inguinal (bronchial, mediastinal, mesenteric).

Glands are either small, large, hard, soft, fluctuating (adherent or non-adherent), discrete or conglomerate.

HEAD.

Size, shape (rachitic, hydrocephalic, microcephalic), fontanelles, tender spots, cranio tabes, hair.

Facies. Placid, stupid, anxious, pinched, puffy, adenoid, alcoholic, heimatrophic, myxoedematous, acromegalic, mask-like (Paralysis Agitans).

Eyes. Pupils (size, equality, shape, reflexes, Argyll-Robertson), ophthalmoplegia (strabismus, ptosis), nystagmus, conjunctivitis, exophthalmos; vision (condition of retina, hemianopsia, amaurosis). Oedema of lids (Pertussis).

* Physical examination is not dependent upon a knowledge of the patient's previous history and present sensations. It is a good plan, therefore, for students to examine the patient before the history is taken. The examination will be made more systematically and accurately in this way.

Nose. Deformities, hypertrophies, tumors.

Lips. Color, herpes, fissures, hare-lip.

Breath. Sweet, foul, alcoholic, uraemic; acetone, gas poisoning.

Tongue. Pale, red, cyanosed, dry, moist, coated, fissures, smooth, rough, indented by teeth, geographical tongue, deviation, salivation, stomatitis, leucoplakia buccalis, mucous patches.

Gums. Color, spongy, lead line (use lens and insert a slip of white paper behind gum), sordes, scurvy.

Teeth. Number, carious, deformed (Hutchinson).

Pharynx. Tonsils, adenoids, membrane, elongated or oedematous uvula, retropharyngeal abscess, pharyngeal reflexes and paralyses (tabes, diphtheria).

Larynx. Voice, laryngoscope.

Ear. Hearing, tympanum, mastoid tenderness, tophi, stigmata.

Neck. Venous fulness, pulsations, tracheal tug, parotid, thyroid, high spinal abscess, spinal curvature, torticollis.

CHEST.

Inspection. Size, form (barrel chest, paralytic chest, pigeon breast, rosary), symmetry and comparative mobility. Rate and character of respiration. Litten's phenomenon. Location and character of cardiac movements. Apex beat, retraction (Broadbent's sign). Pulsation (aneurism, aortic regurgitation, uncovered or displaced heart).

Character of cough — dry, loose, constant, paroxysmal.

Palpation. Râles, tactile fremitus, apex beat, thrills, friction, pulsation, accentuated heart sounds, tender points.

Percussion. Pulmonary resonance, mobility and location of lung and heart borders. Size and position of heart. Respiratory percussion. Sense of resistance.

Auscultation. Respiration, râles, voice sounds, friction rub, succussion. Heart sounds, diminution, accentuation, rhythm, doubling. Murmurs: in erect and dorsal position, time, character, transmission, relation to heart sounds.

ABDOMEN.

Inspection. Size, shape, abdominal walls (thickness, tension, striæ, umbilicus, superficial veins, peristalsis), herniæ.

Palpation. Position, outline and mobility of liver, gall bladder, spleen, kidneys, stomach, bladder (and pancreas);

tumors (see below), relation to inflated colon, stomach and to other organs. Local tenderness (superficial or deep) and resistance, friction, fluctuation wave, succussion, pulsation (aorta), enteroptosis.

Percussion. Outline of liver, gall bladder, spleen, stomach, bladder, uterus, resonance of tumors, gas, ascites (movable dulness), curve of dulness (ascites, cyst).

NERVOUS SYSTEM.

1. **Mental State.** Intelligence. Psychoses, hypochondriasis, apathy, stupor.

2. **Motion.**

1. Paresis or paralysis.

2. Gaits: spastic, ataxic.

3. Reflexes: pupillary, knee jerk, ankle clonus, plantar (Babinski), Kernig's sign.

4. Ataxia (Romberg), localized and general convulsions, tremor, chorea, athetosis, fibrillation.

5. Electrical Reactions.

3. **Sensation.**

1. Tactile, pain, temperature.

2. Delay, paræsthesiæ, muscle sense.

3. Special sense: sight, hearing.

4. **Speech Disturbance.** Aphasia, paralysis.

5. **Trophic Disturbances.**

6. **Sphincters and Sexual Power.**

Extremities. Clubbed fingers, flat-foot, oedema, tenderness (neuritis, trichinosis).

Bones and Joints. Redness, tenderness, swelling, crepitus, mobility, epiphyses, deformity, (spinal curves, bow-legs, arthritis deformans, Heberden's nodes).

Muscles. Atrophy, hypertrophy, tone (firm, flabby), paralysis, spasm, tremor, contracture, fibrillation.

Rectum. Prolapse, fissure, fistula, abscess, piles, impacted faeces, stricture, tumors (prostate, vesiculæ seminales), intussusception.

Genitals. Urethra, character of stream, discharge, glans penis, testes, vagina, uterus, tubes, ovaries, tumors.

Tumors. Location, shape, size, color, consistency, surface, tenderness, mobility (by respiration, by hand), dulness, pulsation, relation to organs.

URINE.

Amount in twenty-four hours. Color. Odor. Reaction. Specific Gravity. Sediment. Turbidity. Shreds.

Albumin. Heat — boiling upper half of urine in test-tube; observe if precipitate disappears on adding dilute acetic acid. If a precipitate appears on heating and disappears on boiling, suspect albumose. Estimate the per cent. of albumin by the nitric acid test.

Sugar. 1. Fehling's Test 10 c. c. of Fehling's solution are reduced by 0.05 gram glucose.

2. Fermentation Test using yeast. Difference in specific gravity before and after complete fermentation, multiplied by 0.23 gives percentage of sugar.

Acetone. To one-sixth of a test-tube of urine add a crystal of sodium nitroprusside. Make strongly alkaline with NaOH. Shake. Addition of glacial acetic acid gives purple color to foam.

Diacetic Acid. Add strong aqueous solution of ferric chloride. A Burgundy red shows presence of diacetic acid.

B. Oxybutyric Acid. If ferric chloride reaction is strongly positive, B. oxybutyric acid is probably present.

Urea. Amount in twenty-four hours. Squibb's method.

Bile. 1. Shake up and look at foam.

2. Iodine test. (Tr. iodine, 1; alcohol, 8.) Pour on top of urine. A green ring at border of two fluids shows bile.

Diazo. Saturated solution sulphanilic acid in HCl. Sodium nitrite, 0.5 per cent. Ammonia. To 4 c. c. sulphanilic acid in HCl add a few drops sodium nitrite. Now add equal part of urine. Shake and add ammonia. A carmine color shows diazo.

Chlorides. Ag NO₃.

Sediment. Macroscopic and microscopic examination. Staining for tubercle bacillus; see sputum. For gonococcus, use Gram's stain.

1. Smear cover glass as thin as possible.
2. Anilin oil-gentian-violet (fresh).
3. Heat to steaming point.
4. IKI solution thirty seconds.
5. Decolorize with 95 per cent. alcohol until alcohol runs clear.
6. Wash in water.
7. Counterstain with saturated aqueous solution Bismarck brown. Diplococci within leucocytes which have been decolorized by Gram and have taken counterstain of brown are gonococci.

BLOOD.

(a) Examination of fresh blood for leucocytosis, fibrin, parasites, Müller's bodies, etc.

(b) Examination of stained specimen. Triple stain + Löffler's Methylene blue.

Red Corpuscles. Variation in size and shape (poikilocytosis). Loss of color (acromia). Tendency toward a general increase or decrease in size.

Number of $\left\{ \begin{array}{l} \text{Normoblasts} \\ \text{Megaloblasts,} \end{array} \right\}$ in one or more stained specimens.

White Corpuscles. Estimation of number of white corpuscles.

Differential Count. Leucocytosis: — presence, kind.

Number of Basophiles (lymphocytes and large mononuclear Neutrophiles.

Oxyphiles (eosinophiles).

Myelocytes (neutrophilic, oxyphilic).

(c) Blood count. Number of red corpuscles.

“ “ white “

(d) Color estimation. Haemoglobin per bulk blood (%).

“ per corpuscles (color index).

(e) Parasites. Malaria. Filaria.

(f) Serum reaction.

(g) Coagulation time.

SPUTUM.

Sputum is sometimes very difficult to obtain for examination, especially in the case of young children. If a cotton stick is inserted into the pharynx it causes coughing, and sputum coming from the trachea may be wiped out upon the cotton before it can be swallowed. Swallowed sputum may be obtained by stomach washing.

Origin. May be from mouth, nose, pharynx, larynx, lung (or stomach), one or more or all.

Amount expectorated in twenty-four hours may vary within wide limits, — small, as in beginning tuberculosis of the lungs, or large, as in chronic bronchitis.

Odor. Ordinarily there is no odor to sputum. Under certain circumstances, however, as in abscess or gangrene of the lung the odor may be foetid and disagreeable.

MACROSCOPIC EXAMINATION.

Inspection. Sputum may be, —

(a) Mucous: viscid.

(b) Purulent: seen in pure form only in perforation into the lung or bronchi of foci of pus such as abscess of lung or empyema.

(c) Muco-purulent: most common form and not characteristic.

(d) Serous: thin, often slightly red in color (blood) and frothy; pathognomonic of oedema of the lungs.

(e) Nummular: common in tuberculosis of the lungs.

(f) Hæmorrhagic: seen especially in phthisis, pneumonia, passive congestion, hæmorrhagic infarction, aneurism of the aorta, new growths, epistaxis and abscess of the lung.

(g) Tenacious as in pneumonia — upset the cup.

Color may be —

(a) Rusty, orange-juice: pneumonia.

(b) Grass-green: pneumonia combined with jaundice.

(c) Black or gray from substances inhaled, such as carbon, or colored by food such as chocolate, berries, wine or tobacco.

(d) Reddish yellow: from rupture of abscess of liver into lung.

MICROSCOPIC EXAMINATION.

Important Constituents.

(a) Bacteria:

1. Bacilli of tuberculosis. Pneumococcus. Bacilli of influenza. Bacillus mucosus capsulatus. Smegma bacillus (in gangrene.) Streptococcus.

2. Fungi: especially of actinomycosis.

(b) Elastic fibres: in all destructive processes in the lung; phthisis, abscess, gangrene.

(c) Fragments of lung tissue: gangrene, new growth.

Unimportant Constituents.

(a) A few leucocytes.

(b) A few red blood corpuscles.

(c) Alveolar epithelial cells, often containing fat and carbon.

(d) Squamous and cylindrical cells.

(e) Common bacteria.

(f) Particles of food.

IMPORTANT TECHNICAL METHODS.

Tubercle Bacilli. Use forceps instead of platinum wire to pick up the sputum. If tubercle bacilli are not found in the first carefully prepared cover-glass, get a fresh specimen from the patient.

1. Sputum should be thinly spread upon the cover-glass.

2. Ziehl's Carbol-fuchsin. Heat to steaming point.

3. Czapelewski's solution until decolorization is complete.

4. Wash in water.

5. Saturated aqueous solution of methylene-blue to the steaming point.

6. Wash in water.

7. Examine in water or balsam.

Elastic Fibres. 1. Boil with equal parts of NaOH in water bath till clear.

2. Centrifugalize.

3. Examine sediment microscopically.

Influenza Bacillus. 1. Löffler's methylene-blue to steaming point.

2. Wash in water.

3. Leucocytes especially to be examined for influenza bacilli.

Capsule Stain. (Welch.) 1. Glacial acetic acid for a few seconds.

2. Drain off and replace with anilin-oil-gentian-violet solution.

3. Wash in 2 per cent. NaCl, and mount in the same.

STOMACH CONTENTS.

Contents of Fasting Stomach removed before breakfast.

Test Breakfast " one hour after eating.

Vomit^{us}: number of hours after last meal.

Amount.	Color.	Odor.	Mucus.	Food.	Froth.
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Reaction. Combined HCl. Total free HCl, — quantitative.

Free HCl. Lactic acid. Total acidity, — quantitative.

Food. Fragments of Mucous Membrane. Blood. Pus.

Contents of Fasting Stomach generally obtained in the morning. Stomach should be empty seven to eight hours after the last meal. If food is still present, it is a sign of stasis. A few c. c. of fluid containing free HCl are of no consequence. They may be due to the irritation of the tube. Amounts above 50 c. c. of gastric juice indicate hypersecretion.

Test Breakfast (Ewald) consists of one slice of bread and a glass and a half of water. At the end of one hour not over 100 c.c. should remain in the stomach. Amounts of 150-300 c.c. imply motor insufficiency or hypersecretion. In one and one-half to two hours the stomach should be empty.

In expression, do not dilute the contents with water.

Vomitus to be examined in the same way as the above. Free HCl may be absent in the vomitus and yet present after a test breakfast.

Amount. See above. The amount of vomitus alone may indicate a dilatation of the stomach.

Color. Fresh blood is suggestive of ulcer; old blood (coffee grounds) of cancer. A few fine streaks of blood are of no significance. A green or yellow color may be due to bile or mould. Avoid mistaking brown fragments of food for blood.

Odor. The odors of butyric and acetic acids are characteristic. Marked fermentation gives a yeasty odor (not due to lactic acid). There is a peculiar odor associated with the presence of sarcinæ.

Mucus. In "catarrh of the stomach," mucus is so abundant that the contents can be poured in a lump from one beaker to another. Small amounts of mucus are also well shown in this way. Mucus requiring acetic acid for its demonstration is of no significance. Gastric mucus is uniform and thoroughly mixed with food. Mucus from the mouth is not.

Food. See Contents of Fasting Stomach. In normal contents, the bread is in fine particles and looks well digested; in Achylia Gastrica, contents differ little from a mixture of bread and water. Size of particles is also an index of mastication.

Froth. When the contents separate into three layers, the lower consists of the undigested portion of the food, the middle of a rather thin liquid, while the upper is made up of froth due to gas liberated by the active fermentation in which are mucus and light fragments of food. Three layers are characteristic of dilatation of the stomach.

Reaction due to free HCl,
combined HCl (acid albumin, etc.),
acid salts,
organic acids.

Free HCl. Test with Günzburg's Reagent (phloroglucin, 2 g.; vanillin, 1 g.; absolute alcohol, 30 g.), which gives a positive reaction only with free HCl. Congo red (paper) turns blue in the presence of 0.01 per cent. free HCl.*

Combined HCl. A part of the HCl is always "combined" with proteids. Free HCl implies combined HCl. Where free HCl is absent, combined HCl may be present and can be tested for by the Ewald-Sjöqvist method.

Acid Salts. Acid Phosphates made by combination of HCl and neutral Phosphates of food. In clinical work these can be neglected.

Organic Acids.

Lactic Acid. Stomach contents should be examined at once, as lactic acid readily develops if they are left for some time in a warm place. Dilute a solution of $\text{Fe}_2 \text{Cl}_6$ to a very faint yellow color with water. Fill the concavities of two test-tubes with this solution, using one for comparison. A canary

* Organic acids and acid salts also produce a somewhat similar reaction with Congo red (a purple or brown), but in solutions more concentrated than are ordinarily found in stomach contents. Congo is therefore not an *absolute test* for small amounts of free HCl in stomach contents.

yellow color on addition of gastric contents suggests lactic acid with considerable certainty. Negative test rules out lactic acid.

When test is positive absolute proof is obtained by adding to 10 c. c. of the contents two drops of HCl, then boil to a syrup and extract with ether. Dissolve the residue obtained upon evaporation of the ether in a little water and test for lactic acid as above.

Butyric and Acetic Acids. See "odor."

Total Acidity. Use Phenolphthalein as an indicator.

Quantitative Estimation of Free HCl and the Total Acidity. A decinormal ($\frac{N}{10}$) solution of NaOH is employed. Each c. c. used represents 1 c. c. $\frac{N}{10}$ HCl in the given amount (5-10 c. c.) stomach contents. 1 c. c. $\frac{N}{10}$ HCl contains 0.00365 g. HCl. The quantitative values of free HCl and the total acidity can be expressed in the terms of % HCl or as the number of c. c. of a $\frac{N}{10}$ solution NaOH necessary to neutralize 100 c. c. gastric contents. 20-50 c. c. (0.07%-0.18%) are the normal limits for free HCl; 40-80 c. c. (0.15%-0.30%) for total acidity.

Fragments of Mucous Membrane are often found in Achylia Gastrica, occasionally in cancer.

Blood. The corpuscles soon disintegrate or are digested. In suspected cases use Teichmann's test, being careful to evaporate the contents slowly.

Pus. The cell bodies are often digested, but the nuclei are easily recognized. Pus may be found in any gastric catarrh; often in the fasting stomachs of patients with ulcer and cancer. Large amounts indicate Phlegmonous Gastritis.

Yeast and Bacteria are usually present in small amounts. In dilatation of the stomach they are abundant.

FAECES.

Amount and frequency of dejections. Reaction. Consistency and form. Color. Odor. Undigested food; muscle, elastic fibres, fat, starch, casein, vegetable fibres. Mucus. Blood. Pus. Tubercle Bacilli. Intestinal Parasites. Fragments of new growth. Crystals.

Amount and Frequency. Dejections vary according to character of food and habit; weight is normally 120–250 g. In starvation they are reduced to a minimum. Stools may be numerous but without faecal matter. In diarrhoea from the lower colon (dysentery) — small, frequent motions; in that of the small intestine or upper colon — large, but seldom.

Consistency and Form. The longer the stools remain in the rectum, the harder and dryer they become.

Reaction. Normally neutral or faintly acid or alkaline. Superficial reaction often different from that of central portion. Cholera and typhoid stools react alkaline. Carbohydrate and milk diets give acid reaction.

Color. Normal brown color due to urobilin. Infants' stools are bright or golden yellow because of bilirubin; on standing they may soon change their color. Color varies with,—

1. Food—light with milk; dark with blackberries, red wine, etc.; green with green vegetables.

2. Drugs — green, calomel; black, bismuth; black, iron, — though perhaps only on standing.

3. Blood. If originating in stomach 500 c. c. are necessary to give characteristic color.

4. Bile — clay-colored from diminished secretion or obstruction of flow of bile. Clay color is also due to unabsorbed fat. Green color of stools depending on bile is pathological.

The test for bile in the stools is complicated, and, except with experts, a negative result is of little value.

Odor. A foul odor indicates intestinal putrefaction.

Mucus is always pathological and if visible in the stools means catarrh of the colon, except in cases of colica mucosa in

which there is a nervous hypersecretion of mucus. It may occur,—

1. As a thick coating.
2. Intimately mixed.
3. Forming the whole stool.
4. As small soft bodies, yellow to brown in color, just visible or even as large as a pea, occurring singly or in large numbers.

Blood. The higher the origin the more it is changed in color. Tarry or “tea-like” stools in gastric hæmorrhages. Confirm by Teichmann’s test, not confusing the hæmin crystals with bismuth crystals.

Pus. Large amounts come from abscesses and ulcers, small amounts may come from catarrh. The pus corpuscles soon disintegrate and are seen with difficulty.

Tubercle Bacilli.

Undigested Food. Muscle fibres are seen in every stool, but their striæ are poorly marked and the ends are rounded; elastic fibres come from a meat diet. Starch is never seen in normal stools and seldom in diarrhœa. Fat: as soaps, neutral fat or fatty acids appear normally in the stools varying with the diet. Fat crystals are seen more than fat drops. Casein: curds are frequently seen in infants’ stools.

Intestinal Parasites. Amœba Coli. Round worms. Pin worms. Tape worms:—pork (*Tænia Solium*. This worm has hooklets about the head.); beef (*Tænia mediocanellata* or *saginata*); *bothriocephalus latus*.

Fragments of new growth. Well obtained by repeated enemata.

Crystals. Not of significance: triple phosphate, neutral calcium phosphate, calcium oxalate, yellow pigmented calcium salts of fatty acids, cholesterin, Charcot-Leyden crystals.

APPARATUS AND CHEMICAL REAGENTS.

Stethoscope.	Burette.
Microscope with oil immersion.	Graduate.
Centrifugal Machine.	Specific Gravity Bulb.
Blood Counter.	Squibb's Urea Apparatus.
Tallqvist's Hæmoglobin Scale.	Test Tubes.
Blood Oven.	Red and blue litmus.
Cover glasses and slides.	Congo paper.
Forceps.	

Nitric Acid — conc.	Sodium Hydrate.
Glacial Acetic Acid.	Sodium Nitro-prusside.
Dilute Acetic Acid.	Ferric Chloride, (strong aqueous solution).
Sulphanilic Acid in HCl, (saturated solution.)	Iodine Solution (Tr. Iodine, 1; Alcohol, 8).
Sodium Nitrite 0.5%.	Silver Nitrate Solution 1 : 8.
Ammonium Hydrate.	

Fehling's Solution. Dissolve 34.64 g. pure CuSO_4 in water and make up to 500 c. c. Dissolve 173 g. Rochelle Salts and 60 g. Sodium Hydrate each in 200 c. c. water and mix, and then make up also to 500 c. c. 5 c. c. of each sol. are used for the test.

Bromine Solution for Urea: Bromine, 30 g.; Sodium Bromide, 30 g.; Water, 240 c. c.

Sodium Hydrate Solution for Urea: NaOH, 100.0 g.; Water, 250 c. c.

IKI Solution: Iodine, 1 g.; Potassium Iodide, 2 g.; Water, 300 c. c. Bismarck brown, (saturated aqueous solution).

Alcohol 95%.

Ehrlich's Triple Stain.

Löffler's Methylene-blue.

Ziehl's Carbol-fuchsin.

Czapelewski's Solution, NaCl, 1.25 g.; HCl, 1.25 g.; 95% Alcohol, 250 c. c.; Distilled Water, 50 c. c.

Methylene blue (saturated aqueous solution).

Anilin-oil-gentian-violet solution.

Sodium Chloride, 2%.

Günzburg's Reagent. Phloroglucin, 2 g.; Vanillin, 1 g.;

Alcohol, 30 g.

Phenolphthalein.

Tincture Iodine.

Ether.

